

REMARKS

The Office Action mailed on March 4, 2005 has been carefully considered and the Examiner's remarks are appreciated. Claims 1-13 were originally presented. Claim 13 has been previously canceled, and claims 1, 2, 5, 6, 9, and 10 have been amended. Therefore claims 1-12 are presented for examination, with support for the amendments found in the Specification, Claims, and Drawings. In response to the Office Action, Applicants respectfully request reconsideration of the rejected claims in view of the above amendments and the following remarks.

Discussion of Rejections under 35 USC §102(b)

In the Office Action, the Examiner rejected claims 1-3, 5-7, and 9-10 under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 4,682,808 to Bilanin. Applicants have amended claims 1, 2, 5, 6, 9, and 10 to clarify the distinctions of the present invention from the prior art. For example, claim 1 has been amended as follows:

~~"...and a peak plate width at a location between top and bottom ends thereof corresponding to a peak vortex of the respective vertically aligned vertical structures with said plate width being shorter at top and bottom ends thereof than at the center to more quickly turn the flowstream around into the base surface at the top and bottom ends than at the center of the vertical boattail plate."~~

As shown, references to the "peak plate width" and "peak vortex" has been replaced with dimensional limitations of the plate width at its top and bottom ends. In particular, the amended language now requires, "said plate width being shorter at top and bottom ends thereof than at the center." In contrast, Bilanin clearly shows only the

top end of the vertical plates having a shorter plate width than the rest of the plate edge which is straight and of uniform width. Additionally, claim 1 has been amended such that the vertical boattail plates are also offset from the top and bottom trailing edges, in addition to the left and right trailing edges. Applicants respectfully submit that the combination of the shorter plate width at the top and bottom ends of the plates, together with the offset placement from all trailing edges, enable the quicker turning of the flowstream around the base surface at the top and bottom ends than at the center of the vertical boattail plate. In contrast, the shorter plate width of the top end of vertical plates 28 and 30 is found at the top trailing edge where it is subject more to the effects of the flowstream coming over the top surface than over the left and right surfaces. Thus, Applicants submit that any advantage provided by the shorter plate width to more quickly turn the flowstream coming from the left or right surfaces is negated by the top edge location taught by Bilanin. Similar amendments have been made to independent claims 5 and 9.

And amendments similar to claims 1, 5, and 9 have also been made to claims 2, 6, and 10 with respect to the horizontal boattail plate. For example, claim 2 has been amended as follows:

"...and a peak plate width at a location between left and right ends thereof, corresponding to a peak vortex of the upper horizontally aligned vertical structure, with said plate width being shorter at left and right ends thereof than at the center, and with the left end of the horizontal boattail plate adjacent the top end of the left vertical boattail plate without extending beyond each other, and the right end of the horizontal boattail plate adjacent the top end of the right vertical boattail plate without extending beyond each other, so that reduced corners are formed which turn the flowstream more quickly around into the base surface at the reduced corners than at the respective centers of the vertical and horizontal boattail plates."

As shown in the figures, the arrangement provided by amended claim 2 produces a configuration with reduced or "chopped off" corners, which allows airflow to turn more quickly at the corners as described in the Specification (see page 8, paragraph [0023]). In contrast, the arrangement shown in Bilanin has either the vertical plates extending past the upper horizontal plate (in Figure 2 and 3), or the vertical and horizontal plates are joined at a corner having a width equal to that of other sections of the plates. In either case, the formation of reduced or "chopped off" corners is precluded, as well as the advantage of turning the flowstream more quickly around into the base surface at the reduced corners.

Thus, Applicants respectfully submit, that the 102 based rejections of claims 1 are moot in view of the amendments and MPEP §2131, since each and every element as set forth in the claims is not found either expressly or inherently described in Bilanin or any other single one of the prior art references, and should be withdrawn.

Discussion of Rejections under 35 USC §103(a)

The Examiner also rejected claims 4, 8, 11, and 12 under 35 U.S.C. §103(a). In particular, claims 4, 8, and 12 were rejected over Bilanin in view of Denmark Pat. No. 64274 to Rinholder; and claim 11 was rejected over Bilanin in view of U.S. Pat. No. 2,665,137 to Kamm.

Applicants respectfully submit that the 103-based rejections are inappropriate and/or moot since the cited references do not teach or suggest all claim limitations as originally submitted or as amended as per discussion above, as required by MPEP §2143.03 as follows in part:

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art"

Since the Ringhoffer reference includes only a single side view of the vehicle and the alleged wedge or triangular-shaped boattail, Applicants have submitted two photos of vehicles (the Tatra "T 1-87"), shown as Exhibit A, manufactured by Ringhoffer to provide a 3D perspective of the subject matter of the Ringhoffer reference. Applicants respectfully submit that the fin shown protruding from the rear and cited by the Examiner as the boattail plate, is in fact not a "boattail plate" as used herein and in the application for purposes of streamlining the tail end of a vehicle to reduce base drag. In particular, it is appreciated that "boattail" commonly refers to the streamlined tail end, such as by tapering, of a projectile or moving object/vehicle for the purpose of reducing aerodynamic base drag. Applicants respectfully submit that the vehicle shown in Ringhoffer is itself already a "streamlined body" (see page 6, paragraph 19 discussing the distinction) with a tapered tail end and without a sizeable "recirculation zone", and the fin does not contribute to the reduction of aerodynamic base drag. On the contrary, it can be appreciated that the protrusion of the fin from the tapered surface of the vehicle, and the additional surface area provided by the protruding fin, will in effect cause an increase in drag on the streamlined body. Furthermore, Applicants submit that the central location of the "fin" would not produce the same or similar vortical structures in a similar manner as that described for the present invention. And there is therefore, no teaching or suggestion to provide wedge shaped boattail plates for the purpose of improving the aerodynamic drag experienced by bluff bodies.

With respect to the Kamm reference, a streamlined body is also shown, but with fins having curvilinear edges. The fins, however, are located above the vehicle, and not to the rear of a base surface as required for the present invention. Thus, these fins arguably would not have any meaningful effect in controlling the drag effect of the sizeable recirculation zone created adjacent a base surface of a bluff body in a flowstream. In support of his rejections, the Examiner stated that it would have been obvious to one of ordinary skill in the art to, *"round the edges of the plates to produce convexly curved plate edges as taught by Kamm in order to reduce weight of the plates as well as reduce accidental impact damage at the corners."* While a rounding of the edges of the plates would certainly reduce the weight of the plates and possibly reduce accidental impact damage at the corners, this line of reasoning however provides no teaching or suggestion to combine such curvilinear feature to the boattail plates of the present invention in order to improve the aerodynamic drag experienced by bluff bodies.

Therefore, Applicants respectfully submit that claims 4, 8, 11, and 12 are not obvious over the cited references, and the 103-based rejections thereof are therefore inappropriate and should be withdrawn.

Summary

Having amended the claims and/or overcome Examiner's rejections as discussed above, Applicant respectfully submits that claims 1-12 are in condition for allowance. Applicants respectfully request allowance of claims 1-12.

In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, he is respectfully requested to initiate the same with the undersigned at (925) 422-7274.

Respectfully submitted,

Dated: August 4, 2005

By: 

James S. Tak
Attorney for Applicant
Registration No. 46,367

Lawrence Livermore National Lab
7000 East Avenue, L-703
Livermore, CA 94550
TEL: (925) 422-7274
FAX: (925) 423-2231